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the chief hydrographic officer that he, too, was in imminent danger in a heavy gale on the 26th of December, but that, having read what the hydrographic office had said about using oil, he "placed a bag in each closet forward, and let her go south-south-east," the effect of which was that he shipped no more water.

After all this, I should not wonder if some Jack tar, a little more imaginative than the rest, should outrun all competitors by reporting to the hydrographic office that he had quelled the raging deep merely by carrying a bottle or two of oil in the ship's locker; just as Hahnemann finally found that it was not necessary actually to take his medicine, but that, if the patient only smelled of the phial in which it was contained, it accomplished the same result.

Now, I should seriously like to know whether there is any more credible evidence that oil has a quieting influence upon the ocean than the kind of trash the newspapers are publishing as coming from the hydrographic office.

C. F. Cox.

New York, Jan. 18.

[Our correspondent assumes a very grave responsibility in trying to throw discredit on the efforts of the hydrographic office to render less dangerous the very hazardous vocation of the sailor. The efficacy of the use of oil to smooth the rough waters has been known for centuries, and the seamen of all countries have been in the habit of resorting to it when the necessity has arisen, although, for the reasons given below, not as freely as would be desirable. The evidence accumulated by the hydrographic office, through its branches in the seaboard cities, is the result of the first systematic attempt ever made by any government to collect such information, and to disseminate it, in the widest possible manner, among the class most interested. Many seamen have used it with success; and most, having heard of its value ever since boyhood, have always intended to use it on occasion. It must be borne in mind, however, that there is much to be done on board a ship undergoing all the vicissitudes incident to a gale of wind; and, unless the captain has had previous experience, he is not likely to think of experimenting when there is so much to do which he knows to be necessary. Seamen, also, though given to the telling of 'yarns,' are slow to believe them, a very harsh and trying experience making this class most incredulous and conservative.]

The life-saving services of this country and Great Britain have made experiments with a view to demonstrating the usefulness of oil in quelling the surf. The results, however, have been unsatisfactory; yet this investigation led them incidentally into the subject of its usefulness off shore with most satisfactory results. The report to the superintendent of the U. S. life-saving service in 1883, of a committee appointed to examine this matter, states in conclusion, "The majority of the printed statements herewith, assuming them to be authentic, together with all verbal statements made by mariners who have used it, furnish conclusive evidence that in deep water oil has a calming effect upon a rough sea."

In an article published in the *Nineteenth century* for April, 1882, Mr. C. F. Gordon Cumming states that "it is now many years since I first endeavored to call public attention to the simple precaution." "Though the casting of oil on troubled waters has been so persistently regarded merely as a poetical

figure of speech, notes of its actual use have occasionally appeared in books of travel;" and, again, "It has been reserved for the nineteenth century to find the practical application of the observations made by Pliny eighteen hundred years ago." The correspondent's confessed want of knowledge of the sea leads him very properly to make inquiries in regard to its 'prodigies and marvels;' but his sympathy should restrain him from decrying any attempt to benefit a class which, on the whole, gets a very small share of the substantial comforts of life.—ED.]

The following is a letter received at the Boston branch of the hydrographic office:—

On Nov. 28, 1885, I left Boston for London, deep with general cargo, and cattle and sheep on the upper deck. At 8.30 P.M. of Dec. 4 we were caught in a heavy storm at W. N. W., bar. 29.20. The first hour of the storm no canvass could stand it. In lat. 44° 38' and long. 48° 28' W., ship running under bare poles, the sea was then so high and dangerous. I resolved to try the use of oil, having had it brought to my notice by information on your chart. I got two common gunny-bags and a good wad of oakum wrung out in paint-oil, and hung over each quarter, just dipping in the water, also one over by the scuppers in the midships. At 10 P.M. I got the lower topsail set, and continued to run until noon next day. By the racing of the engines my engineer reported to me that he could not run much longer, as the packing of the gland of the high-pressure engine was all worn out. I then got two more farther forward with a hand in each water-closet forward, dropping oil through; by this means she kept steady on her course, engines stopped, and sailing 6 knots, while the engineer did his work comfortably. I landed the whole of my cattle alive at Deptford, and never broke any of the cattle-pens.

The use of oil I strongly recommend in an emergency: a small drip is of no use. I used one gallon per hour, and had the watch continually going round attending one bag after another.

The result you know, and I hope it will be of use to shipmasters.

KENNETH DOYLE, *Master*.

Furness line, SS. Stockholm City,  
Boston, Jan. 17.

### The Taconic controversy in a nutshell.

In *Science*, No. 153, Prof. N. H. Winchell, in writing under the above head, presents a very timely demurrer against the injustice done to the memory of Professor Emmons in ignoring the name 'Taconic,' and substituting 'Cambrian,' and several other designations, for pre-Potsdam formations other than Archaean.

In referring to recent studies of rocks that have been claimed as part of the Taconic by Emmons, Professor Winchell writes, "Some of the opponents of Emmons, re-enforced lately by active, younger men, revive the fossiliferous character of some of the eastern belts as new matter, adding many interesting and valuable details, and begin again to fire at the old fort long ago abandoned by Emmons, insisting that Emmons is still intrenched there (1872-85)."

I have several reasons for thinking that I have been understood to have taken a stand as part of the re-enforcement, because of my having recently published a paper on the subject mentioned, and entitled "On the occurrence of fossils in the 'Hudson

River' slates in Orange county, N.Y., and elsewhere."<sup>1</sup>

In this paper I described the finding of Trenton fossils in slates that Emmons had always considered to be of Taconic age; and Professor Mather's<sup>2</sup> statement that the remains of 'Testacea' were found at certain localities in these states appears to have been overlooked in Emmons's latest discussion of the subject (likewise in that of Dr. Hunt<sup>3</sup>). In calling attention to the nature of these remains, and adding a new locality, with descriptions of the structure of the beds, I was only presenting bare statements of facts; but, in consideration of the Taconic theory, I employed the words 'Fossils in the Hudson River slates,' etc., rather than 'Trenton fossils in the Taconian argillite,' in my title.

It can be readily understood how isolated patches of Utica slates could extend along the Hudson valley as far south as noted by Booth;<sup>4</sup> but my observations, together with those of Dale,<sup>5</sup> show the occurrence of Trenton fossils in beds at several widely separated points in the slate belt (I have discovered other localities since my paper), and point to the age of the great mass of these slates as post-Potsdam. An examination of the relations at Rock Tavern and at Sugar Loaf plainly proves that the fossiliferous beds are not isolated patches, and that neither are they superficial layers enclosed in synclinal folds, nor brought to their present positions by faulting.

In this connection it may be well to state that for some time the writer has been engaged upon a very detailed study of the structure of these slates, and the associated limestones and other formations. Many paleontological and stratigraphical discoveries have been made which will solve some of the problems of their ages and relations. A portion of the results of this work will be ready for publication early in the next summer.

NELSON H. DARTON.

Brooklyn, N.Y.

### The temperature of the moon.

I hope that Professor Ferrel and I have no real ground of dispute: I may at least think so, since he does not deny that he begins by speaking of a certain body endowed by hypothesis with peculiar properties; such, for instance, as imply invisibility. Professor Ferrel, as I now understand him, explains that this implication is non-essential, and merely an analytical device to explain what would take place on a certain sphere, on which (by hypothesis still) the relative radiating and absorbing powers of every part are not merely proportional for any given ray, but to be safely treated as absolutely and without restriction equal, — a sphere on which, instead of physical approximations, we have absolute truths, which, like the axioms of Euclid, can be safely pushed to their extremest consequences.

This sphere it is my complaint that Professor Ferrel identifies with the moon, though it also seems to be a homogeneous body, not a world of irregular surface and structure; a body freed from changes of temperature, and which (unless infinitely conductible) would appear to need, not to alter its distance from the sun or rotate on its axis, — an absolutely

airless body; and so on, through a really endless list of limitations, which we should find, on scrutiny, latent in his premises. *Under these limitations*, I do not dispute any of his conclusions; nor, when I say that no actual body in nature does exist under them, do I at all deny his right to consider one which by hypothesis shall do so, nor the interest of such an inquiry. I only call the reader's attention to the undoubted fact that the real moon exists under quite other ones. While I do not for a moment admit that the temperature of the real moon is independent of the amount of heat which it rejects by reflection, I can readily agree that it might be quite immaterial to the temperature of this hypothetical moon. I have no disposition to treat such an hypothesis as idle: I acknowledge its interest, and, I may add, its utility, if employed under clearly recognized limitations.

I recognize with respect the accuracy of the logical process always at Professor Ferrel's command; but, I repeat, the more accurate it is, the more certain it is to deduce only such conclusions as are implicitly contained in its premises.

Though he himself refers in part to these limitations at the outset, the general reader may certainly require to be reminded that they are not embraced in Professor Ferrel's conclusions, which may well be deduced from commonly made assumptions, by correct reasoning, as to a hypothetical moon, and yet not apply without limitation to the real one which we see waxing and waning in the sky. This is all I have to say, and I leave to Professor Ferrel the last word in this friendly controversy if he chooses to add it.

S. P. LANGLEY.

Allegheny observatory, Jan. 12.

### Demand for good maps.

I am very glad that you have taken upon yourself to criticise our maps and the map-makers' methods, and sincerely hope that you may succeed in so stirring up the publishers that they will feel compelled to abandon the habit of servilely copying ancient, and oftentimes obsolete examples. I have been seriously inconvenienced at times, particularly when giving instruction in geography, by the outrageous carelessness, not to say gross ignorance, displayed by our leading cartographical institutions.

I heartily concur in what Mr. C. H. Leete says concerning the German maps. We are far indeed from their standard. Why is it? It is no exaggeration to say that the cheap German school-atlas, to which Mr. Leete refers, is much more reliable, and more nearly up to date, even in the geography of the United States of America, than the most expensive of our home productions.

Some years ago the travelling agent of one of our leading map-publishing houses called upon me, and insisted upon showing me their latest atlas, revised and corrected to date. I gave him every opportunity to explain the superior excellence of his wares, and, after he had had his say for over half an hour, I showed him that most of his maps were exact copies of those published from five to twenty-five years previously, the only apparent change being in the shades and elaboration of colors. Why, actually, though this was scarcely five years ago, the map of New York city showed the 'Crystal Palace'! Even where details appeared to fill in former blanks, more than one-third were mere guesses, and about as good

<sup>1</sup> *Amer. journ. sc.* (3d ser.), xxx. p. 452, 1885.

<sup>2</sup> Final report, 1843, p. 369.

<sup>3</sup> The Taconic question, *Trans. Roy. soc. Canada*, vol. i.

<sup>4</sup> *Amer. journ. sc.* (3d ser.), xxvi. p. 380, 1883.

<sup>5</sup> *Ibid.*, xvii. p. 57, 1879.